A REVISION OF THE NORTH AMERICAN SPECIES OF *METOPHTHALMUS* (COLEOPTERA: LATHRIDIIDAE)

Fred G. Andrews

Department of Food and Agriculture,
Division of Plant Industry, Laboratory Services, Sacramento, CA 95814

Abstract

The widespread genus *Metophthalmus* Wollaston is recharacterized, and the 8 North American species are keyed, described, and illustrated. Biological notes are given for the western species. *M. albosignatus* Fall, 1899, is placed in synonymy with *M. americanus* Motschulsky, 1866. *M. haigi* (type-locality Silverthorne, Shasta Co., California), *M. kanei* (type-locality Laguna Seca, Monterey Co., California), and *M. sandersoni* (type-locality Washington Co., Arkansas) are described as new.

Introduction

The genus *Metophthalmus* Wollaston is 1 of 11 North American genera included in the tribe Lathridiini. The generic name *Metophthalmus* refers to the eyes, which appear superior because of the lateral extension of the gena (fig. 1); this character can be used to separate the genus from all other Lathridiidae. The genus occurs in the Nearctic, Neotropical, Palearctic, and Ethiopian regions but appears to be most common in the temperate areas of North America, southern Europe and northern Africa. Included in the genus are 36 described species; 8 are North American, and 3 are new.

The 1st species described in the genus *Metophthalmus* was *M. asperatus* Wollaston, 1854 (type by monotypy), from the Madeira Islands, 400 miles off the northern coast of Africa. The 2nd species described and the 1st from North America was *M. parviceps* LeConte, 1855. The next North American species was *M. americanus* Motschulsky 1866; the unique type probably is in Russia, and has not been seen by any worker since Motschulsky. Fall (1899) monographed the genus in North America and added 3 species (*M. albosignatus, M. rudis* and *M. trux*). There has been no additional work since Hatch described *M. septemstriatus* from Oregon in 1962. Hammad (1953) described the immature stages of *M. serripennis* Broun, 1914, a species introduced into England from New Zealand in commerce.

Individuals of *Metophthalmus* are small (1.0 mm to 1.8 mm), reddish-brown beetles that live in ground litter where they feed on fungi. They usually are heavily coated with a chalky wax-like exudate that obscures the rugosities of the head and pronotum. The small size, cryptic coloration, and obscure habitat have resulted in few collections and a resultant poor representation of these beetles in collections.

Acknowledgements

I wish to express my appreciation to the following individuals and institutions for the loan of specimens. Abbreviations will be used to indicate the repository of specimens. American Museum of Natural History (AMNH); California Academy of Sciences (CASC); University of Califor-

nia, California Insect Survey (CISC); Canadian National Collection of Insects (CNCI); California State University at Long Beach (CSLB); Cornell University Insect Collection (CUIC); Insect Collection at Illinois State Natural History Survey (INHS); Joe Schuh, Klamath Falls, Oregon (JSCC); Museum of Comparative Zoology, Harvard University (MCZC); Oregon State University, Department of Entomology Collection (OSUO); California State University at San Jose (SJSC); University of California, Davis (UCDC); University of California, Riverside (UCRC); United States National Museum (USNM).

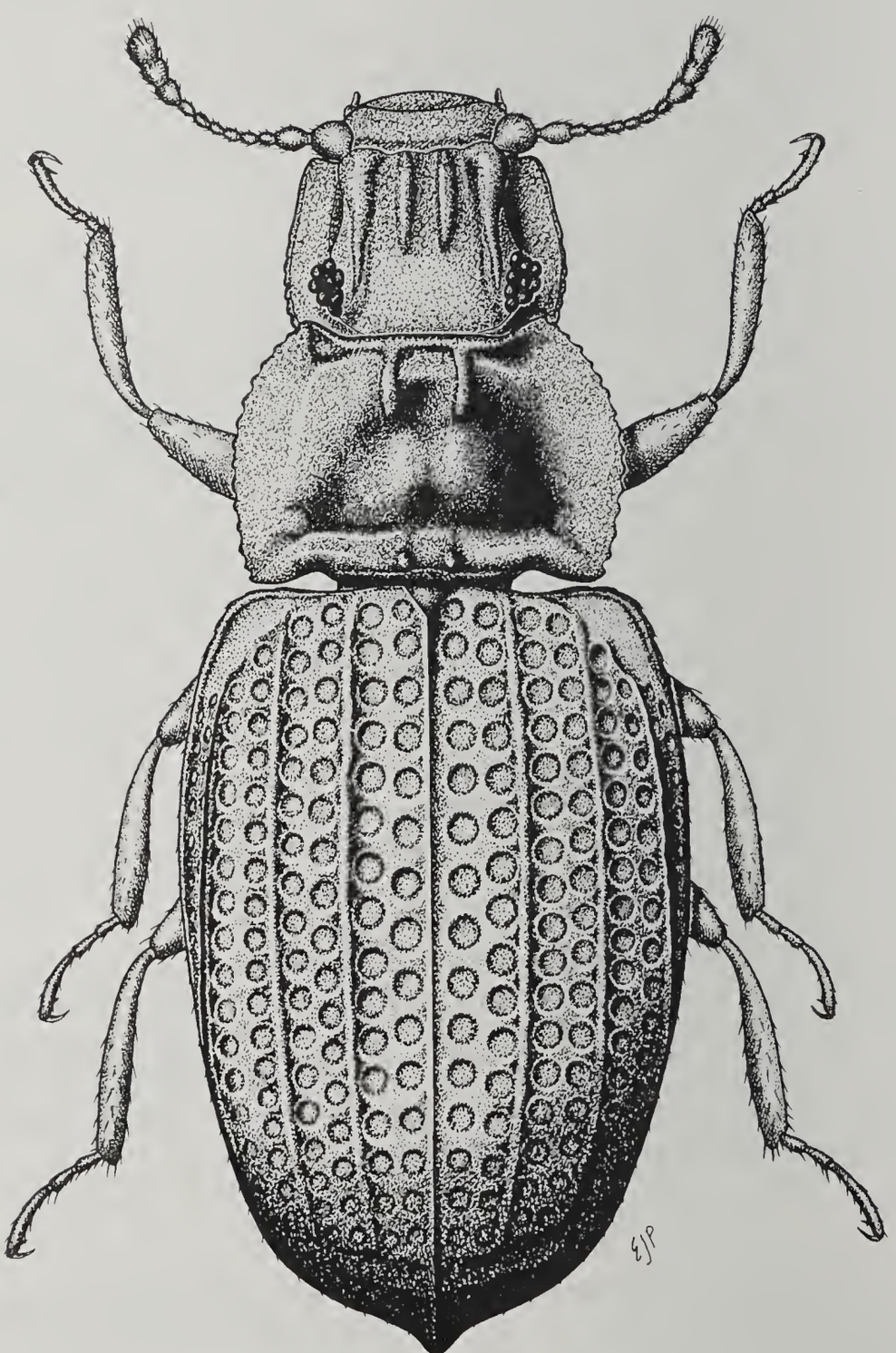


Fig. 1. Dorsal view of *Metophthalmus rudis* Fall.

Special appreciation goes to Dr. J. F. Lawrence, Museum of Comparative Zoology, for making available the lathridiids associated with higher fungi from his collection; Dr. E. L. Sleeper, California State University at Long Beach, for allowing me to sort through alcohol samples of berlese material from Southern California and Baja California Norte, Mexico; Dr. I. M. Newell, University of California, Riverside, for allowing me to sort through his alcohol samples from Southern California; Mr. D. Giuliani, Big Pine, California, for running berlese samples from various localities on the east side of the Sierra Nevadas; Messrs. E. A. Kane, T. R. Haig, R. F. Wilkey, and R. Hobza, California Department of Food and Agriculture, who collected litter samples throughout California; Dr. A. R. Hardy for reading the manuscript; and to Ms. K. S. Corwin who prepared slide mounted specimens, collected litter samples, and helped in preparation of the manuscript.

Methods

Several papers suggest techniques that allow the waxy white covering to be softened and then removed with fine needles. The small size of these beetles makes this difficult and time consuming. I have found that ½ to 2 hours immersion in turpentine followed by washing in xylene and then absolute ethyl alcohol will satisfactorily clean specimens. Longer exposure to turpentine will cause a darkening of the integument.

If the beetles are to be slide mounted, the exudate can be removed in the clearing process. Specimens are placed in cold 10% KOH for 48 hours and then gently heated for 20-30 minutes in Essig's Aphid Fluid. The wax exudate will go into solution when heated in the EAF, but round globules will precipitate out and adhere to the specimen if the specimen is left in the fluid while cooling, therefore immediate transfer to cellosolve is recommended. Critical morphological analysis is possible only when specimens are slide mounted with exudates removed.

All measurements given were taken from slide mounted specimens. Pronotal outlines were made from tracings of photographs. Numbers of punctures in elytral striae 7-8 are most accurately determined by using cleared specimens in solution, but can be done with pointed specimens.

Biology

Little is known about the life history of these beetles. Hinton (1941) cites collection of *M. hispidus* Belon from tobacco in Chile and *M. serripennis* Broun from warehouse storage in England. Hammad (1953) gives life history details of *M. serripennis* Broun reared on fungal cultures in the laboratory.

I have successfully reared *M. kanei* n. sp. on fungal cultures generated by inoculating agar culture plates with extracts from litter samples. In these mixed-fungi cultures the beetles avoided all but 1 fungus, which may indicate specific food preference. Both larvae and adults grazed on the spores and hyphae of the fungi. Lawrence (in litt.) has on several occasions taken adults from fruiting bodies of higher fungi, but never in the numbers that can be found in litter.

The rarity of specimens in collections is an artifact of collecting tech-

nique. In nature they are relatively abundant and may be collected in numbers by berlese funnelling litter samples.

Berlese sampling of litter from various California localities has led to a generalized picture of the habitat of *Metophthalmus* in California (fig. 2). On the map, closed circles represent samples containing *Metophthalmus* and open circles represent samples without *Metophthalmus*. All positive samples west of the Sierra Nevada have 2 things in common; they come from the lower to mid-elevation foothills, and are in oak areas. East of the Sierra Nevada, several samples containing *Metophthalmus* did not contain oak litter.

The data from the berlese survey of litter indicated a correlation between the presence of *Metophthalmus* and an oak litter substrate. This correlation was tested by pairing oak against each of the 3 most commonly occurring litter producers in *Metophthalmus* areas.

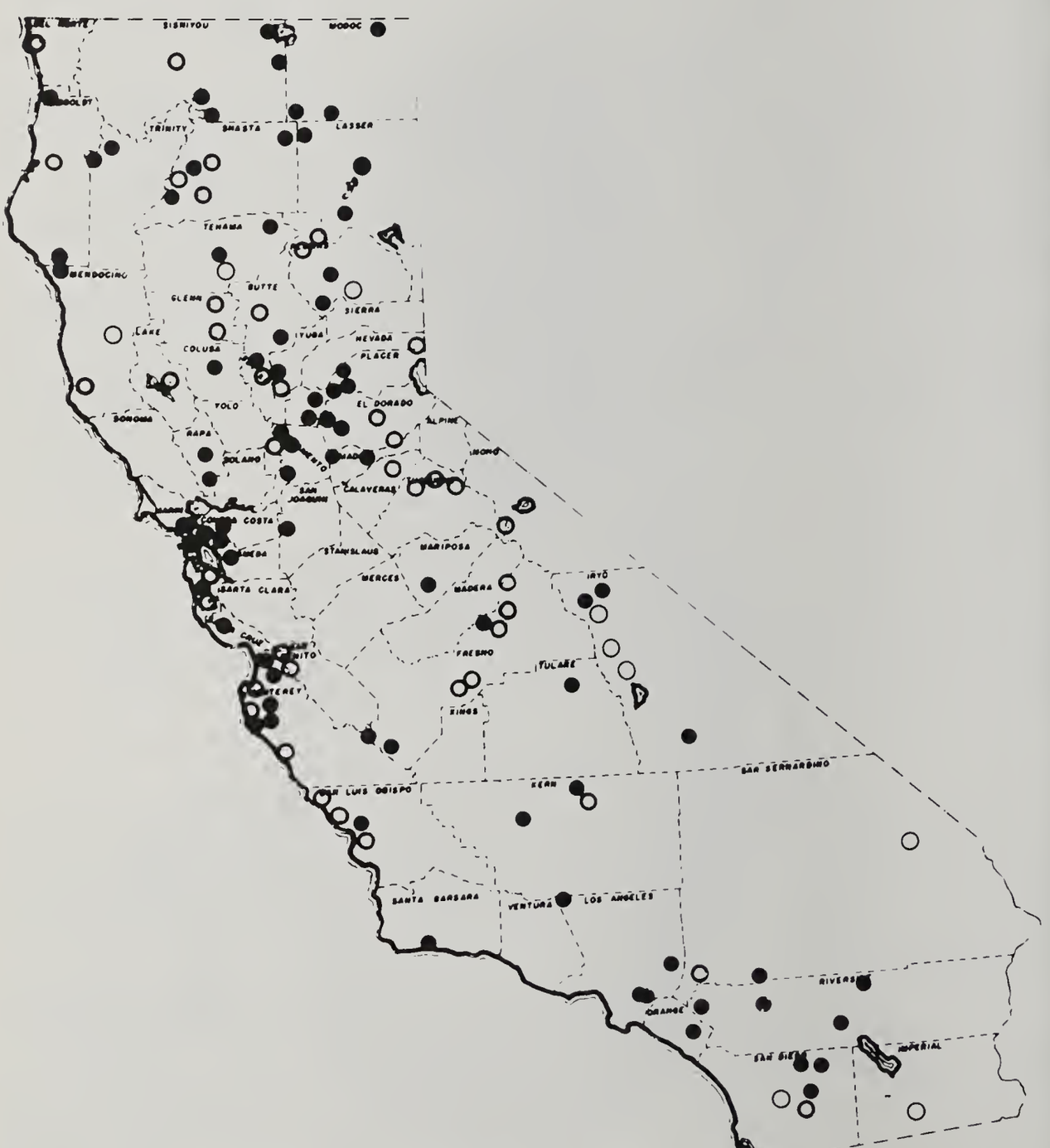


Fig. 2. Distribution of litter collection sites in California. Berlese samples positive (dot) or negative (circle) for *Metophthalmus* sp.

Three sites were chosen from widely separated locales, each with a different species of *Metophthalmus* dominant. Site I was in El Dorado County with *M. parviceps* dominant, but with *M. trux* not uncommon; Site II was in Tulare County with *M. trux* the dominant species; and Site III was in Monterey County with *M. kanei* the only species present. The 4 litter producing plants, Oak, Pine, *Arctostaphylos,* and *Ceanothus,* were present at each site.

Nine comparisons were made at each site. Each comparison consisted of 3 litter samples (1 cu. yd.); 1 of pure oak litter taken beneath an oak standing relatively isolated from other litter producing plants, 1 of the litter producing plant being compared to oak, and 1 of mixed litter taken where an oak and the alternative litter producing plant were growing together. The 3 litter samples for each comparison were usually taken within 50 feet of each other, and in no case more than 200 feet apart. Three comparisons of oak × pine, oak × *Arctostaphylos* and oak × *Ceanothus* were made at each site. In total, 27 litter samples were berlesed from each site. The 27 samples were all within 200 yards of each other.

Table 1 depicts the results, each notation represents a single litter sample. In no case was *Metophthalmus* recorded from a sample without oak. This, combined with the fact that almost all general samples positive for *Metophthalmus* contained oak, appears to demonstrate the dependence of *Metophthalmus* on oak litter substrate. It is likely that the oak controls the presence or absence of certain fungi, probably by a pH factor.

Oak litter contains a relatively depauperate Coleoptera fauna and often only contains lathridiids. If the samples are extremely damp, ptiliids replace the lathridiids. Staphylinids, carabids and tenebrionids are often present, but not consistently or in large numbers.

Substrate Types

	OAK	MIXED	PINE
SITE 1	+	+	-
2	+	+	-
3	+	-	-
	OAK	MIXEI	CEANOTHUS
SITE 1	+	+	-
2	+	+	-
3	+	+	-
	OAK	MIXED	ARCTOSTAPHYLOS
SITE 1	+	+	-
2	+	-	-
3	+	+	-

Table 1. The occurrence of *Metophthalmus* as a function of litter composition. (+) Berlese sample contained *Metophthalmus*; (-) Berlese sample void of *Metophthalmus.*

Key to North American *Metophthalmus*

1. Elytron with 6 rows of striae 2
1′. Elytron with 7 or 8 rows of striae 5

2(1). Antenna 10-segmented ..... *parviceps* LeConte
2′. Antenna 11-segmented 3

3(2′). Trochanter elongate cylindrical, length twice width ..... *americanus* Mots.
3′. Trochanter width subequal to length 4

4(3′). Median carina of head extending from frons to vertex; pronotal cup complete ..... *trux* Fall
4′. Median carina of head present in anterior ½ of head only; pronotal cup effaced except for anterior lateral points ..... *sandersoni* n.sp.

5(1′). Elytron with 7 rows of striae ..... *septemstriatus* Hatch
5′. Elytron with 8 rows of striae 6

6(5′). Pronotal cup complete; median carina of head extending from frons to vertex ..... *haigi* n.sp.
6′. Pronotal cup effaced except for anterolateral points; median carina present in anterior ½ only 7

7(6′). Pronotum broadly arcuate (fig. 10); limited to coastal areas south of San Francisco Bay ..... *rudis* Fall.
7′. Pronotum subsinuate (fig. 9); distribution non-costal ..... *kanei* n.sp.

Genus *Metophthalmus* Wollaston

(meta = "on top of", ophthalmus = "eye")

Description: Small, length 1.0-1.8 mm, elongate-oval, depressed, usually partially covered with chalky-white exudate. Head an elongate trapezoid, narrowed anteriorly, front with 2 well-defined lateral costae, with or without 2 median costae bisecting frons; eyes small, lateral, near occiput, composed of few large facets; genal area laterally flanged, extending beyond eyes, eyes appearing superior; clypeus and labrum elongate-rectangular, divided by distinct suture, clypeus meeting truncate frons on lower plane. Antenna 10- or 11-segmented, scape large and globular, pedicle smaller and globular, flagellum 5-6 segmented, segment 3 widest at base, 4-7 or 8 moniliform and widest apically, 3 terminal segments forming distinct club. Mouthparts concealed by expansion of mentum into large rectangular plate; plate excavated at anterior corners, circular labial palps form corners of plate; maxillary palp 3-segmented, 1st small, quadrate, 2nd large, expanded distally, 3rd small, cylindrical, dense setae terminally, galea with forward edge armed with large hooklike setae. Mandible toothed distally, with prostheca and molar area. Occiput rounded, slightly constricted to short neck. Pronotum transverse; lateral margins explanate, serrulate, arcuate to sinuate; disk with quadrate cup complete or partially effaced; coxal cavities closed. Elytra oval, dorsally flat or slightly inflated, each with 6-8 rows of striae formed by large deep punctures, glabrous, apical angles explanate, serrate. Sternum glabrous, with

or without sparse small punctations, mesothorax and metathorax with or without pit. Abdomen 6-segmented. Coxae globose. Legs short, each with femur moderately expanded medially; tibia narrow, cylindrical; tarsus 3-segmented, terminal segment elongate. Male genitalia simple, tape-like or sclerotized tube.

Metophthalmus trux Fall, 1899

Description: Length 1.2-1.6 mm. Width 0.3-0.5 mm. Body elongate, subparallel; flat in profile; glabrous. Cutical shining; pale reddish brown; dorsal exudate limited to low relief areas of pronotum and underside of body except terminal abdominal segment. Lateral carinae distinct, partially obscuring eyes when viewed from above; median carinae complete, subparallel. Genal flange arcuate, gradually expanded posteriorly; slightly longer than wide. Frons obliquely truncate. Clypeus wide, blending into genal flange. Labrum short. Pronotum explanate, lateral margins minutely serrulate, slightly expanded in anterior half (fig. 4); pronotal cup complete; pronotal collar entire. Elytra 6-striate; punctures uniform in size; sutural striae 18-punctate; interspaces 3 and 5 distinct only apically; humeral flange narrow in apical ⅓; coxae globular; trochanter ham-shaped; femora elongate-ellipsoidal, hooked around trochanter basally. Metasternal pits rectangular between coxae, reduced to 2 distinct pockets on mesal edge of coxae on first abdominal sternite. Male genitalia elongate, tape-like.

Type: S. B. Mts., Cal. 8.10.92; M.C.Z. Type 24496. Fall did not label a type. I am designating this specimen as lectotype.

Material examined: California—Amador Co.: 3 mi. S. Michigan Bar, 14-IV-72, F. G. Andrews, oak duff [CDAE] (2); Pine Grove, 5-III-71 and 28-III-71, F. G. Andrews, oak duff [CDAE] (5). Butte Co.: Chico, 4-XII-72, T. R. Haig [CDAE] (1); Wyandotte, 24-X-71, F. G. Andrews, oak duff [CDAE] (1). El Dorado Co.: 2 mi. E. Cameron Park, 12-X-70, F. G. Andrews, oak duff [CDAE] (2); El Dorado, 18-VII-71, F. G. Andrews [CDAE] (2). Fresno Co.: 10 mi. N.E. Auberry, 31-I-66, J. Prine, *Arctostaphylos* litter [CDAE] (1); 11 mi. W. Coalinga, 28-X-71, F. G. Andrews, oak duff [CDAE] (13); 15.8 mi. W. Coalinga, 16-XI-71, F. G. Andrews, oak duff [CDAE] (2). Humboldt Co.: Kneeland School, 30-IV-73, T. R. Haig, oak duff [CDAE] (1); Redway, 1-III-72, T. R. Haig, moss [CDAE] (1). Inyo Co.: Westgard Pass, XI-72, D. Giuliani, pine duff [CDAE] (2). Lassen Co.: 7 mi. W. Nubieber, 13-I-72, T. R. Haig, oak duff [CDAE] (4). Los Angeles Co.: Brown's Flats, San Gabriel Mts., 20-XI-58, 1-II-59, 2-I-60 and 13-II-60, M. Knox and E. L. Sleeper [LBSC] (14). Modoc Co.: 10 mi. W. New Pine Creek, 20-V-60, W. Cooper, Manzanita litter [UCDC] (1). Monterey Co.: Arroyo Seco P.C., 30-XII-61, E. L. Sleeper [LBSC] (2); Cachagua Road, 4 mi. S.E. Carmel Valley, 3-III-72, F. G. Andrews and K. S. Corwin [CDAE] (1); 2 mi. S.E. Carmel Valley, 31-III-72, F. G. Andrews, K. S. Corwin, oak duff [CDAE] (1); 2.1 mi. S. Carmel Valley, 9-V-73, F. G. Andrews, oak duff [CDAE] (1); 1 mi. N. Jamesburg, 31-III-72, F. G. Andrews and K. S. Corwin, oak duff [CDAE] (1); Salmon Creek, 2 mi. E. Hwy 1, 10-IX-69, J. D. Pinto, duff [UCRC] (1); 19.4 mi. E. San Lucas, 16-XI-71, Fred G. Andrews, oak duff and *Heteromeles arbutifolia* duff [CDAE] (9); 19.8 mi. E. San Lucas, 28-X-71, F. G. Andrews, oak duff [CDAE] (1); 20.9 mi. E. San Lucas, 16-XI-71, F. G. Andrews, oak duff [CDAE] (2); 20.9 mi. E. San Lucas, 24-III-72, E. A. Kane, *Heteromeles* litter [CDAE] (9). Napa Co.: Lower Chiles Valley Rd. and Hwy. 128, 28-VI-71, F. G. Andrews [CDAE] (1); Intersection of Chiles and Lower Pope

Valley Rds., 1-XI-72, F. G. Andrews, oak duff [CDAE] (1); 2 mi. E. Napa, 4-II-71, W. W. Wiard, oak duff [CDAE] (1). Placer Co.: 2 mi. W. Auburn, 3 mi. S. Auburn and 10 mi. N. Auburn, 8-XI-70, 17-I-71 and 10-X-71, R. F. Wilkey, oak duff [CDAE] (18); 5 mi. S.W. Auburn, 10-X-71, F. G. Andrews, oak duff, [CDAE] (5); Rocklin, 6-XI-71, F. G. Andrews and E. A. Kane, oak duff [CDAE] (6). Riverside Co.: 2 mi. N.W. Gilman Hot Springs, 21-IV-64 and 16-V-65, Fred G. Andrews, [CDAE] (3); Gilman Hot Springs, 7-XI-72, F. G. Andrews, and E. A. Kane, *Neotoma* nest [CDAE] (5); Pinyon Wells, 14-V-66, E. L. Sleeper and S. L. Jenkins [CDAE] (1); Strawberry Creek, San Jacinto Mts., 22-II-73, I. M. Newell, leaf litter [UCRC] (6). Sacramento Co.: Carmichael, 19-I-71, R. F. Wilkey, oak duff [CDAE] (1); Elk Grove, 15-III-71 [CDAE] (2); Rio Linda, 20-II-71, R. F. Wilkey, oak duff [CDAE] (21). San Benito Co.: 15 mi. S. Paicines, 16-XI-71, F. G. Andrews, oak duff [CDAE] (13). San Bernardino Co.: 1.8 mi. W. Jenks Lake, 23-III-58, I. M. Newell, black oak litter [UCRC] (1); Seven Oaks, 26-I-63, I. M. Newell, dry oak litter [UCRC] (1). San Diego Co.: Borrego, Palm Canyon, 25-IV-55, R. O. Schuster [CISC] (3). San Francisco Co.: San Francisco, 2-XII-06, E. C. Van Dyke [CASC] (1). San Luis Obispo Co.: Pennington Creek Res., 17-X-68, R. Delameter [CDAE] (1). Santa Cruz Co.: Ben Lomond, 5-VII-53, C. D. MacNeil [CISC] (1). Shasta Co.: Silverthrone, 28-II-71, T. R. Haig, live oak and manzanita duff [CDAE] (1). Shasta Co.: Whiskeytown, 9-III-72, T. R. Haig, oak duff [CDAE] (1); 3 mi. S. Whiskeytown, 31-I-73, T. R. Haig [CDAE] (14); Whiskeytown, 16-IV-73, T. R. Haig [CDAE] (1). Siskiyou Co.: 3 mi. N. Dunsmuir 23-II-70 and 31-V-72, T. R. Haig, oak duff [CDAE] (2). Sutter Co.: Sutter Buttes, 8-XI-71, E. A. Kane, oak duff [CDAE] (2). Tehama Co.: Paynes Creek, 24-XI-72 and 31-XII-72, T. R. Haig, oak duff [CDAE] (13); 4 mi. N. Red Bluff, 22-XI-71, T. R. Haig, oak duff [CDAE] (1). Trinity Co.: 5 mi. E. Salyer, 19-III-71, T. R. Haig, [CDAE] (2). Tulare Co.: Kaweah, 16-XI-71, F. G. Andrews, oak duff [CDAE] (6); Kaweah Power Station, 16-XI-71, F. G. Andrews, oak duff [CDAE] (2). OREGON—Benton Co.: Scott's Hill, 1 mi. S.W. Corvallis, 26-III-59, J. D. Lattin, grass and moss [OSUO] (3). Josephine Co.: Rough and Ready St. Pk., 2 mi. N. O'Brien, 20-V-60, J. D. Lattin, moss [OSUO] (1). Klamath Co.: Bly Mountain, 5-V-61, J. Schuh, willow duff [JSCC] (1). OKLAHOMA—Osage Co.: IBP Comprehensive Site, 11-VII-71, R. C. Reed, ungrazed area [KSUC] (1). TEXAS—Brown Co.: Brownwood, 19-VIII-37, L. D. Christenson [USNM] (1). Colorado Co.: Columbus, 14-VIII, Hubbard and Schwarz [USNM] (2). MEXICO—Baja Calif.: Cerralvo Island, 16-IV-62, R. Banks, *Ganoderma zonatum* [MCZC] (1).

Remarks: This species may be separated from all other North American *Metophthalmus* by the 6-striate elytra, a complete median carina on the head, and a complete pronotal cup. Also distinctive is the broad, subparallel pronotum.

M. trux is the most widely distributed North American species, extending from the Pacific Northwest through California into Baja California, and into Texas and Oklahoma (fig. 11). The interspecific variation is small in spite of the extended distribution. A single specimen in the Fall type series from Columbus, Texas, has an effaced median carinae on the head. The specimen is teneral and the difference probably developmental.

Metophthalmus americanus Motschulsky, 1866

Metophthalmus albosignatus Fall, 1899. **New Synonomy**

Description: Length, 1.0-1.1 mm. Width, 0.2-0.3 mm. Body feebly subparallel, flat; glabrous. Cuticle moderately shining, pale testaceous;

elytra with slightly darker mottled areas; legs and antennae uniformly testaceous. Heavy encrustation of white exudate on anterior surface of head, pronotum, lateral margins of elytra, a patch approximately 2 punctures wide extending from edge of elytron 2/3 of the way back, nearly to suture, and entire underside except legs, trochanters and last 1 or 2 abdominal segments. Head slightly longer than wide; slightly arcuate lateral carina from base of antenna to midpoint of eye; median carinae almost totally effaced; short lateral carina extending from base of eye halfway to antennal insertion; genal flange not extending beyond eyes. Eyes large, tempora wanting. Antennae 11-segmented, transverse, 11 subequal in length to 9 and 10. Clypeus broadly truncate. Labrum slightly indented, gently arcuate. Pronotum wider than long by ratio of 4:3; anterior ½ arcuate, posterior ½ subparallel (fig. 4); pronotal cup effaced except for anterolateral nodes. Elytra oval; 6 striae; punctures large with 16 in sutural row; interspaces 3 and 5 distinctly carinate; humeral flange almost obsolete. Coxae oval; trochanters elongate-cylindrical, more than twice as long as wide; femora ellipsoidally expanded. Metasternal pit rectangular except anterior corners slightly projected and shallow; pits in 1st abdominal segment limited to 2 small pockets adjacent to mesal side of coxae. Male genitalia elongate, tape-like.

TYPE: Mobile, Alabama. I have not studied Motschulsky's type of *M. americanus,* but I feel confident that the description fits the specimens of *M. albosignatus* I have studied. Additionally, the Gulf Coast distribution fits with *M. albosignatus.* Following is a translation of Motschulsky's Latin description.

> Metophthalmus americanus *Motsch., elongate, convex, hairless, reddish-brown, small black eyes, antennae and legs marbeled red; head narrow, frons bisected by furrow; thorax broader than head, explanate, uneven, anteriorly obliquely attenuated, dorso-posteriorly with two folds and two deep impressions, laterally angulate at middle, posterior corners forming right angles; elytra broader than thorax, elongate-elliptical, convex, with deep pits arranged in lines and alternate with narrow keels, shoulders rounded.*
>
> *Length 1/2 line*, width 1/5 line**
>
> *Smaller, narrower and less tapering than Met. lacteolus.*
>
> *I have caught it at the feet of trees in Mobile, Alabama in North America.*
>
> *A line equals 1/12 an inch, therefore 1/2 line = 1mm and 1/5 line = 0.4mm.

The entire description fits the *M. albosignatus* material, but the size and pronotal shape are shared by no other described New World species.

Material examined: FLORIDA—Alachua Co.: Gainesville, 7-XII-26, W. B. B. [PURC] (1). Dade Co.: Biscayne, 21-V, 24-V and 31-V, Hubbard and Schwarz [USNM] (7); Homestead, 1919, Schwarz and Barber, *Zamia* flowers [CUIC] (24); Upper Key Largo, 12-XI-72, C. W. and L. B. O'Brien, hammock litter [CDAE] (3). Highlands Co.: 4 mi. S.E. Lake Placid, 30-VI-65, J. F. Lawrence, *Polyporus* sp. (*s.lat.*) [MCAC] (2). Pinellas Co.: St. Petersburg, 24-VI, Hubbard and Schwarz [USNM] (2).

Remarks: The elongate cylindrical trochanters at once differentiate this species from other North American species, all of which have a short club-shaped trochanter. The distinctive cylindrical trochanters cast doubt on its placement in this genus. The world-wide generic concepts of the Lathridiini are at this point poorly defined, and the only means of placing the

genera is a key by Hinton (1941). In this key, *M. americanus* would fall into *Eufallia* primarily on the similar shape of the trochanters. Species of *Eufallia,* however, differ greatly from *M. americanus* in general form, shape of pronotum, filamentous antennae, and lack of genal projection. The general form of *M. americanus,* the antennal character, genal projection, and shape of pronotum all are as in North American *Metophthalmus* and dictate its present placement in the genus.

Fig. 3-10. Pronotal outlines of North American species of *Metophthalmus.*

The only known collections of this species have been along the Gulf of Mexico (fig. 13), and in association with *Zamia* sp. and *Sideroxylon mastichodendron* Jacq. It is possible that *M. americanus* is the northern extension of a more tropical element of the genus and has its affinities with neotropical forms. Unfortunately, I have not been able to study neotropical material.

Metophthalmus septemstriatus Hatch, 1962

Description: Length, 1.2-1.8 mm. Width, 0.4-0.5 mm. Body elongate; subparallel; flat in profile; glabrous. Cuticle shining, dark reddish brown; exudate limited to thin layer between carina on head and heavy coating on pronotum, humeral flange, and under surface of body. Head short; lateral carinae complete; median carinae complete, diverging slightly towards vertex; lateral carina extending from midpoint of eye to antennal insertion. Tempora wanting. Genal flange parallel with head, barely extending beyond eyes; margin serrulate. Antennae 11-segmented; segments 4-8 moniliform, as wide as long, 9 slightly longer than wide, 10 transverse; apical segment 1.5 times longer than wide. Anterior margin of frons concave. Clypeus laterally rounded, embracing frons. Labrum rounded. Pronotum sinuate, margins serrulate; anterior ½ of pronotal cup entire (fig. 5); pronotal collar without nodes. Elytra 7-striate; punctures uniform in size throughout; interspaces 3 and 5 slightly raised; sutural stria with 17 punctures; humeral flange explanate, anterior corners produced, with several nipple-like setiferous projections. Coxae oval; trochanters distinctly longer than wide, femora compressed and ellipsoidal. Area between metacoxae deeply indented with diagonally extending projections into metasternum. Sutures behind 1st and 2nd abdominal sternites deep. Male genitalia elongate, tape-like, with sclerotization and curvature at terminal ⅓.

TYPE: McMinnville, Yamhill Co., Oregon, 27-X-1933, K. M. and D. M. Fender [CASC].

PARATYPE: Oregon, Benton Co., Corvallis, 15-V-1949, V. Roth, fir needles [OSUO] (1).

Material examined: ARIZONA—Cochise Co.: Rustler Park, 8 mi. W. Portal, 3-VIII-61 and 8-VIII-61, J. F. Lawrence, *Hirshioporus abietinus* and *Larcifomes officinalis* [MCZC] (3). Pima Co.: Catalina Mts., 27-VII-17, 7500-7800 ft. [CUIC] (7). CALIFORNIA—Alameda Co.: Berkeley, 10-III-19, J. O. Martin, wood rat nest [CASC] (1); Berkeley, 19-XII-19 and 11-II-20, H. Dietrich, *Pinus radiata* [CUIC] (2); Oakland, 7-VII-61, J. F. Lawrence, *Coriolus versicolor* [MCZC] (2); Tilden Park, 8-X-60, J. F. Lawrence, *Coriolus versicolor* [MCZC] (1); U. C. Botanical Gardens, 28-X-62, W. J. Turner [WSUC] (1). Contra Costa Co.: Walnut Creek, VI-60, G. Pieper [CISC] (1). Los Angeles Co.: Pasadena, II, A. Fenyes [CASC] (9). Marin Co.: Mill Valley, various dates throughout year, H. B. Leech [CASC] (89). Mariposa Co.: Head of E. Fork Piney Creek, 2-IV-64, H. B. Leech, cynipid gall [CASC] (1). Mendocino Co.: 1 mi. S. Piercy, 14-V-61, J. F. Lawrence, *Fomitopsis pinicola* [MCZC] (1). Monterey Co.: Big Sur, 14-V-60, J. F. Lawrence, *Coriolus versicolor* and *Lenzites betulina* [MCZC] (2). Napa Co.: Lower Chiles Valley Road and Hwy. 128, 11-X-70 and 28-VI-71, Fred G. Andrews [CDAE] (9). Plumas Co.: Nr. Camel Peak, 24-IX-55, H. Ruckes, Jr., *Pinus lambertiana* cones [CISC] (1). Santa Cruz Co.: Ben Lomond, 25-II-62, J. F. Lawrence, *Fomitopsis pinicola* [MCZC] (1). Tulare Co.: Nr. Little Baldy, Sequoia Nat. Park, 21-IX-55, H. Ruckes, Jr., *Pinus lamber-*

tiana cones [CISC] (1). OREGON—Benton Co.: Corvallis, 15-V-49, V. Roth, fir needles [OSUO] (1). CANADA—British Columbia: Green River Campsite, 9-VIII-68, J. Borden, *Cryptoporus volvatus* [CNCI] (1).

Remarks: *M. septemstriatus* was described by Hatch (1962) from a series taken in Oregon. Dr. Hatch apparently saw 2 long series from the San Francisco Bay area on deposit in the California Academy of Sciences, but did not mention them in the original description.

This species is not uncommon in samples taken in coastal California in the San Francisco Bay area, but is very rarely taken in the Sierra Foothills (fig. 12). Specimens from Arizona are slightly larger and the sculpture less pronounced.

M. septemstriatus is unique in having the elytra with 7 rows of striae; however, the lateral margins of the elytra are often heavily encrusted, obscuring the striae. The combination of the entire median carinae of the head and incomplete pronotal cup are needed to separate it from the very similar and sympatric *M. haigi* and *M. kanei.*

Metophthalmus parviceps LeConte, 1855

Description: Length, 1.0-1.3 mm. Width, 0.3-0.5 mm. Body subparallel; humped in profile; glabrous. Cuticle shining; granulose between punctures; reddish brown. Dorsal area head and pronotum (except for lateral margins), flange of elytra, underside (except mouthparts), coxae, legs and terminal segment of abdomen obscured by chalky exudate. Head with lateral carinae subparallel, extending from frons to vertex; median carinae effaced except for anterior remnant. Tempora wanting. Genal flange arcuate, rounded, extending well beyond eyes; lateral margin with 5-6 setiferous papilliform projections. Antennae 10-segmented with 3-segmented club; segments 5, 6, 7 transverse. Clypeus truncate. Labrum evenly rounded, contiguous with lateral margins of clypeus. Pronotum wider than long by ratio of 31:21; broadly explanate and evenly arcuate laterally with 16 ±1 setiferous papilliform projections (fig. 6); pronotal cup effaced except for anterolateral nodes. Elytra subparallel, 6-striate, interspaces 3 and 5 slightly raised; sutural punctae 16; punctae of striae 1 and 2 appreciably larger than those of 3-6; humeral flange distinct, bearing setiferous, nipple-like projections anteriorly. Coxae rounded; trochanters ham-shaped, slightly longer than wide; femora compressed and expanded, subrectangular. Metasternal pit deep, form rectangular with anterolateral fingers; metasternum and first abdominal segment fused between coxae. Male genitalia elongate, tape-like.

TYPE: A LeConte type with a gold disk indicating California. Fall, 1899 indicates San Jose, Santa Clara Co. as the type locality, but it is not indicated on the type. MCZ Type 6995.

Material Examined: CALIFORNIA—Alameda Co.: county record only, IV, A. Koebele [USNM] (1). Butte Co.: Chico, 4-XII-72 and 2-V-73, T. R. Haig, oak duff [CDAE] (2). Colusa Co.: 2 mi. N. Colusa, 29-II-72, F. G. Andrews, oak duff [CDAE] (2). El Dorado Co.: 2 mi. E. Cameron Park, 12-X-70, F. G. Andrews, oak duff [CDAE] (4). Lake Co.: 9 mi. E. Clearlake Oaks, 29-III-73, T. R. Haig, oak duff [CDAE] (7). Lassen Co.: 7 mi. W. Nubieber, 13-I-72, T. R. Haig [CDAE] (2). Marin Co.: Mill Valley, 13-X-54, 17-XII-54 and spring-55, H. B. Leech, burrs of *Castanopsis chrysophylla* [CASC] (22); Mill Valley, 14-VI-52, H. B. Leech, *Neotoma* nest [CASC] (2). Modoc

Co.: Day, 2-III-73, T. R. Haig [CDAE] (1). Napa Co.: Lower Chiles Valley Rd. and Hwy. 128, 28-VI-71, F. G. Andrews [CDAE] (1); 2 mi. E. Napa, 4-II-71, W. W. Wiard, oak duff [CDAE] (1). Placer Co.: 2 mi. W. Auburn, 8-XI-70, R. F. Wilkey, oak duff [CDAE] (39); 10 mi. N. Auburn, 18-III-71, R. F. Wilkey, oak duff [CDAE] (4); 2 mi. W. Colfax, 14-X-71, E. A. Kane, oak duff [CDAE] (1); 2 mi. W. Foresthill, 2-II-72, F. G. Andrews, oak duff [CDAE] (3). Plumas Co.: 4 mi. S. San Benito P.O., 16-XI-71, F. G. Andrews, oak duff [CDAE] (1). San Mateo Co.: county record only, A. Koebele [CASC & USNM] (13); Hubbard and Schwarz [USNM] (1). Shasta Co.: Fall River Mills, 2-V-72, T. R. Haig, oak duff [CDAE] (1); 3 mi. S. Whiskeytown, 31-I-73, T. R. Haig [CDAE] (4); 3 mi. S.E. Whiskeytown, 9-III-73, T. R. Haig, oak duff [CDAE] (6); Whiskeytown, 16-IV-73, T. R. Haig [CDAE] (5). Siskiyou Co.: 3 mi. N. Dunsmuir, 31-V-72, T. R. Haig, oak leaves [CDAE] (1). Tehama Co.: Paynes Creek, 31-XII-72, T. R. Haig, oak duff [CDAE] (3). Tulare Co.: Kaweah, 16-XI-71, F. G. Andrews, oak duff [CDAE] (2). OREGON—Jackson Co.: 15 mi. E. Ashland, 23-III-62, Vertrees and Schuh, oak duff [JSCC] (1).

Remarks: *M. parviceps* is the only North American species with 10-segmented antennae. It is frequently taken in berlese samples with *M. trux* and *M. septemstriatus,* but is easily distinguishable by its small size and very heavy encrustation of exudate.

The known distribution (fig. 14) is not easily explained. While it is common for the San Francisco Bay Area to be the northern or southernmost extension of a species, it is not common for the distribution of a species to be truncated in the mid-Sierras.

Metophthalmus haigi Andrews, **new species**

Description: Length, 1.1-1.3 mm. Width, 0.3-0.4 mm. Body elongate, parallel; flat in profile; glabrous. Cuticle shining, pale reddish brown; exudate dorsally limited to low profile areas of prothorax, ventrally covering entire surface except for legs and terminal abdominal segments. Head elongate, narrow; lateral and median carinae entire, distinct. Genal flange straight, minutely serrate, produced laterally same distance as eye. Antennae 11-segmented; segments 4-8 moniliform. Pronotum laterally explanate, margins evenly serrulate, sinuate (fig. 7); pronotal cup complete. Elytra 8-striate; sutural striae 1-4 appreciably larger than 5-8; interspaces 3 and 5 slightly carinate apically; humeral flange strongly produced basally. Coxae globular; trochanter short; femora moderately expanded, hooking back around coxae. Deep metasternal pit between coxae; diagonal fingers extending to midpoint of metasternum. Male genitalia sclerotized and arcuate.

TYPE: Silverthorne, Shasta Co., California, 9-VI-1971, oak duff, T. R. Haig. Type to be deposited in California Academy of Sciences.

PARATYPES: Same data except III-27-1971 (1), VI-9-1971 (6), V-2-1971 (6); paratypes to CASC, USNM, MCZ.

Material examined: CALIFORNIA—Fresno Co.: 10 mi. N.E. Auberry, 31-I-61, J. Prine, *Arctostaphylos* duff [CDAE] (1); 20.9 mi. W. Coalinga, 16-XI-71, F. G. Andrews, *Neotoma* nest and oak duff [CDAE] (1). Inyo Co.: 5 mi. E. Big Pine, 28-IV-53, G. A. Marsh and R. O. Schuster [UCDC] (1); White Mts., 28-VIII-65, O. Clarke, *Populus trichocarpa* duff [UCRC] (13). Kern Co.: 4 mi. N. Altasierra, 28-IV-74, J. Doyen, *Polyporus volvatus* [CISC] (14). Lassen Co.: 7 mi. W. Nubieber, 13-I-72 and 18-IV-72, T. R. Haig, oak duff [CDAE] (2); 3 mi. N. Susanville, 18-IV-72, T. R. Haig, oak duff

[CDAE] (4). Los Angeles Co.: S. Slope Angeles Nat'l. Forest, 7-IV-57, I. M. Newell [UCRC] (1); Brown's Flats, San Gabriel Mts., 30-IX-58 and 1-II-59, M. Knox and E. L. Sleeper [LBSC] (2); 2 mi. S.E. Gorman, 28-X-71, E. A. Kane, oak duff [CDAE] (3); Pasadena, A. Fenyes [CASC] (1); San Dimas Exp. For., 19-XII-59, 2-I-60 and 23-I-60, M. Knox and E. L. Sleeper [LBSC] (4). Mariposa Co.: Mariposa, 4-IV-56, R. O. Schuster [UCDC] (1). Modoc Co.: Day, 2-III-73, T. R. Haig, [CDAE] (1). Riverside Co.: Mt. San Jacinto, 20-IV-58, I. M. Newell, *Artemisia* [UCRC] (1); Pinyon Wells, 4-III-67, E. L. Sleeper and S. L. Jenkins [LBSC] (1); Prado Dam, 4-V-63, I. M. Newell, oak duff [UCRC] (2); 10 mi. E. Redlands, 3-X-65, R. Ryckman, *Neotoma* nest [UCRC] (3). San Benito Co.: 15 mi. S. Paicines, 16-XI-71, F. G. Andrews, oak duff [CDAE] (11). San Bernardino Co.: Cajon Canyon, 17-IV-57, I. M. Newell, Joshua Tree, *Artemisia* and pine duff [UCRC] (1). San Diego Co.: Borrego, Palm Cyn. and Sheep Cyn., 25-IV-55 and 27-IV-55, R. O. Schuster [UCDC] (4). Shasta Co.: Silverthrone, 27-III-71, 2-V-71, 9-VI-71 and 26-II-72, T. R. Haig, oak duff, manzanita and pine duff, and oak leaves [CDAE] (16); 3 mi. S. Whiskeytown, 31-I-73, T. R. Haig [CDAE] (8); Whiskeytown, 16-IV-73, T. R. Haig [CDAE] (2). Siskiyou Co.: Lava Beds Nat'l Mon., 3-III-61, 6-IV-61 and 26-V-61, J. Schuh and E. Hansen, pack rat nest [JSCC] (4); W. side Tulelake, 15-IV-71, J. Schuh and J. Bailes, pack rat nest [JSCC] (4). Sutter Co.: Sutter Buttes, 8-XI-71, E. A. Kane, oak duff [CDAE] (1). NEVADA—Washoe Co.: Little Valley, 1970, N. Stark, Jeffrey pine litter, 6600 ft. [USNM] (1).

Remarks: This species has 8 elytral striae and in Fall's revision keys to *M. rudis*. It is quite distinctive and may be separated from the other 8-striate species, *M. rudis* and *M. kanei,* by the complete pronotal cup and entire median carinae on the head. It is interesting that in spite of its wide distribution (fig. 17) and abundance in recent collecting, it was represented by a single specimen from Pasadena when Fall revised the group, and was identified as *rudis*?

Morphologically, *M. haigi* has little variability throughout its range. One character is varied geographically. Elytral striae 7 and 8 are distinct posteriorly, but anteriorly only a single row of punctures is present. This short row, which I refer to as striae row 7+8, varies in the number of punctures. The northern specimens from Shasta, Lassen and Modoc Counties have 4-5 punctures, whereas all specimens from more southern localities have 1 or 2 punctures. This difference, although consistent and absolute, does not seem to merit nomenclatural status as it appears to be of less importance than the differences used to separate other species. Additional studies may indicate differently, so I am restricting the type series to those specimens having 4-5 punctures and occurring in Shasta and Lassen Counties.

This species is named for Survey Entomologist Mr. T. R. Haig of the California Department of Food and Agriculture who made the first collection and has brought me many litter samples from various areas in California.

Metophthalmus kanei Andrews, **new species**

Description: Length, 1.1-1.2 mm. Width, 0.3-0.4 mm. Identical to *Metophthalmus rudis* with the following exceptions: Head with median carinae present in anterior 3/4. Lateral margins of pronotum less arcuate, anterior angles less produced (fig. 8). Pronotal cup effaced except anterolateral ½; anterior margins only partially effaced.

TYPE: Laguna Seca, Monterey Co., California, X-29-1971, oak duff, Fred G. Andrews. Type to be deposited in California Academy of Sciences.

PARATYPES: 165 specimens same data. Paratypes to be deposited in CASC, USNM, MCZC.

Material examined: CALIFORNIA—Alameda Co.: Berkeley, 2-X-19 and 8-I-20, H. Dietrich [CUIC] (14); Berkeley, 23-X-62, J. T. Doyen, *Lepiota* [CISC] (4); Oakland, 3-II-51, N. A. Lewis [SJSC] (1); Redwood Canyon, 6-I-20 and 1-II-20, J. O. Martin [CASC & SJSC] (28); Tilden Park, 12-III-61, J. F. Lawrence, *Sternum hirsutum* [MCZC] (1). Monterey Co.: Arroyo Seco P.C., 30-XII-61, E. L. Sleeper [LBSC] (6); 2 mi. S. E. Carmel Valley, 31-III-72, F. G. Andrews and K. S. Corwin, oak duff [CDAE] (2); 2 mi. S. Carmel Valley, 9-V-73, F. G. Andrews, oak duff [CDAE] (4); 10 mi. N.E. Castroville, 29-X-71, F. G. Andrews, oak duff [CDAE] (14); Laguna Seca, 29-X-71, 8-I-72 and 31-III-72, F. G. Andrews, oak duff [CDAE] (24); Mill Creek, 28-X-71, F. G. Andrews, oak, bay and incense cedar duff [CDAE] (1); Salmon Creek, 2 mi. E. Hwy. 1, 10-IX-69, J. D. Pinto, duff [CDAE] (1). San Luis Obispo Co.: 7 mi. N.E. Morro Bay, 28-X-71, F. G. Andrews, oak duff [CDAE] (4). San Mateo Co.: Jasper Ridge, 18-I-48, S. Hildebrant [CASC] (3). Santa Barbara Co.: Refugio, 3-IV-72, D. Tieman, oak duff [CDAE] (1).

Remarks: To adequately diagnose this species and separate it from the closely related *rudis* Fall is most difficult. Variations in several characters do not seem to follow any large scale geographical pattern, but these characters are relatively constant in local populations. These variable characters include the number of punctures in elytral striae row 7+8 and the form of the pronotum.

M. kanei is considered distinct from *M. rudis* Fall because: (1) The form of the pronotum is more arcuate and the anterior projection of the pronotum is more strongly produced (fig. 8); (2) the number of punctures in elytral stria 7+8 is most frequently 4-5 as opposed to 6 and more in *M. rudis*; and (3) the geographical distribution (fig. 15) (coastal side of Coast Ranges) correlates with the previous characters.

M. kanei may be distinguished from the other 8-striate species, *M. haigi,* by the effaced posterior ½ of the median carinae of the head and the pronotal cup reduced to anterior lateral nodes. In *M. haigi* the median carinae are complete as is the pronotal cup.

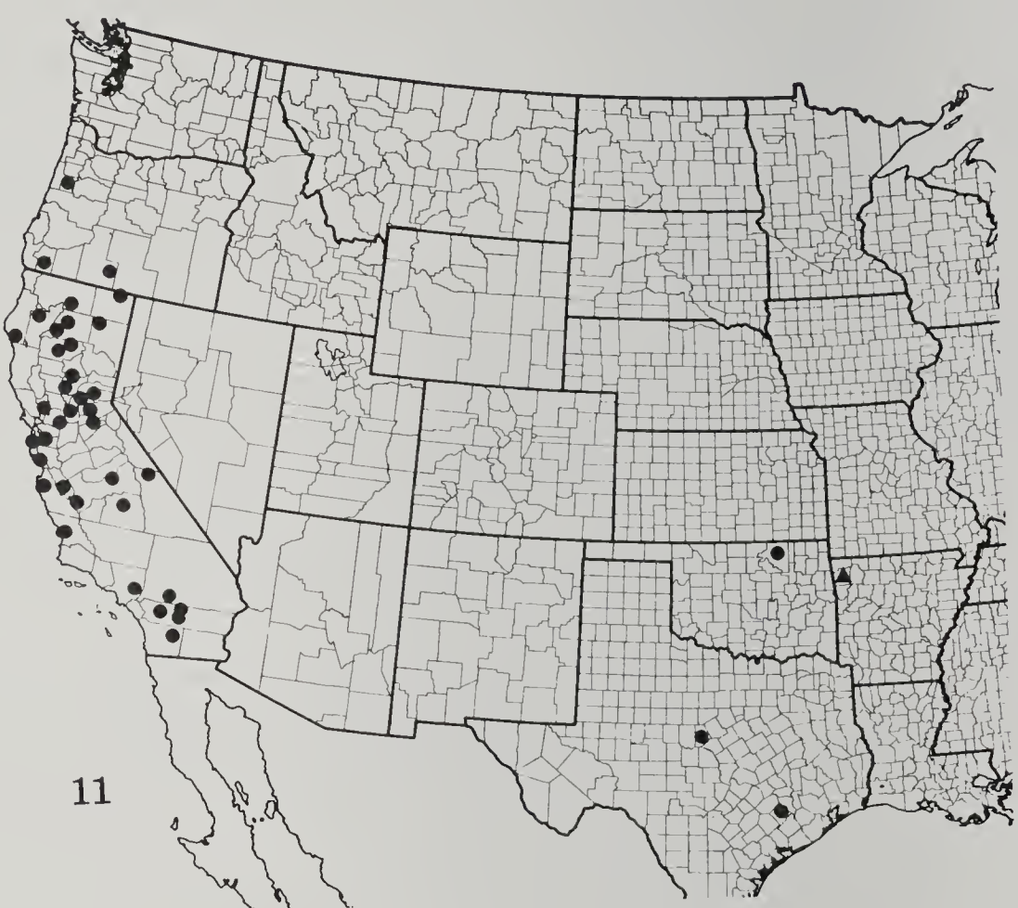
While most *Metophthalmus* are not abundant in the field, *M. kanei* is extremely abundant locally. Litter samples taken at Laguna Seca, Monterey Co., Calif. have had as many as 500 beetles per 1½ cubic feet of litter. All known collections of this species are from litter containing oak leaves.

This species is named after my friend, the late E. A. Kane, who spent many hours collecting duff samples both for me and with me.

Metophthalmus rudis Fall, 1899

Description: Length, 1.3-1.5 mm. Width, 0.4-0.5 mm. Body elongate oval; humped in profile; glabrous. Cuticle dull, dark reddish brown. White chalky exudate lightly covering dorsum, heavily covering low profile areas of pronotum, humeral flange and undersurface, except legs and terminal abdominal segment. Head subquadrate; lateral carinae distinct in anterior half. Genal plate with lateral margins evenly arcuate, minutely serrate, extending well beyond eye. Antennae 11-segmented; segments 4, 5, 6 longer than wide. Pronotum wider than long by ratio of 3:2; lateral margins evenly serrate, broadly, evenly arcuate; anterior angles strongly

produced (fig. 9); pronotal cup reduced to anterolateral nodes; pronotal collar distinctly binodal. Elytra 8-striate; sutural striae 18-punctate; interstrial spaces 3 and 5 moderately distinct; puncture size gradually diminishing from inner to outer striae; humeral flange wide, basally produced. Coxae oval, trochanter wider than long, meeting femora diago-



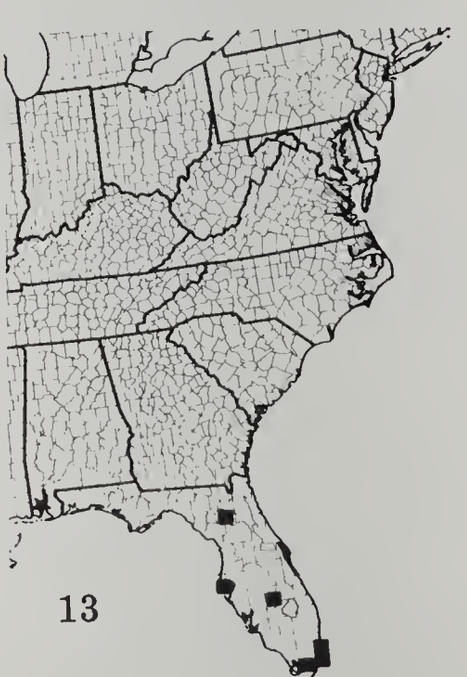


Fig. 11-13. Known geographic distributions of *Metophthalmus* spp.: 11) *M. trux* (dot) and *M. sandersoni* (triangle); 12) *M. septemstriatus*; 13) *M. americana* (star = type locality).

nally; femora only moderately expanded, subcylindrical. Mesosternum with deep pit anteriorly between coxae; metasternum with arcuate pit posteriorly, but anterior to coxae. Genitalia distinctly sclerotized and arcuate in form.

TYPE: Ojai, Cal. 3.10.92; M.C.Z. Type 24495. Head and pronotum missing. Three undesignated specimens with same date compare exactly with remainder of type specimen and Fall's description.

PARATYPE: Single specimen in USNM labeled, (1) Los Angeles Co., Cal., (2) A. Koebele collector, (3) H. C. Fall det., (4) Cotype. Type No. 4434 USNM.

Material examined: Fresno Co.: 15.8 mi. W. Coalinga, 16-XI-71, F. G. Andrews, oak duff [CDAE] (7); 20.9 mi. W. Coalinga, 16-XI-71, F. G. Andrews, *Neotoma* nest and oak duff [CDAE] (2). Kern Co.: 11.2 mi. N., 3.6 mi. E. Bakersfield, 27-XII-65, J. P. Bruen [CISC] (5). Inyo Co.: N. Fork Oak Creek, IX-72, D. Giuliani, black oak duff, 6000′ [CDAE] (1); Panamint Valley, IV-61, A. Koebele [CASC] (4); White Mts., 28-VII-65, O. Clarke, *Populus trichocarpa* duff [UCRC] (13). Los Angeles Co.: Azusa, II-06, A. Fenyes [CASC] (1); Brown's Flats, San Gabriel Mts., 1-II-59 and 2-I-60, M. Knox and E. L. Sleeper [LBSC] (3); Pasadena, VI, A. Fenyes [CASC]; county record only, Coquillet [USNM] (1), A. Koebele [USNM and CASC] (1 each). Monterey Co.: Cachagua Rd., 4 mi. S.E. Carmel Valley, 3-III-72, F. G. Andrews and K. S. Corwin [CDAE] (14); Hastings Res., Tassajara, 25-I-46 and 10-IV-46, Linsdale, *Neotoma* nest [CASC] (6); Jamesburg, 25-I-46, 14-II-46, 16-III-46, IV-10-46 and 9-XII-46, LPT, *Neotoma* nest [CASC] (8); 1 mi. N. Jamesburg, 31-II-72, F. G. Andrews and K. S. Corwin, oak duff [CDAE] (37); Tassajara Rd., 14 mi. S. Hastings Res. Hqtrs., 27-VIII-68, P. Rubtzoff, wood rat nest, 4000′ [CASC] (3). Orange Co.: county record only, 12-II-30, *Neotoma* nest [USNM] (1). Riverside Co.: 14 mi. S.E. Mountain Center, 1-IV-69, F. G. Andrews, oak-pine duff [CDAE] (19); Pinyon Wells, 15-IV-65, 30-X-65, 19-II-66, 14-V-66, 7-I-67, and 4-II-67, E. L. Sleeper and S. L. Jenkins [LBSC] (6); Prado Dam, 4-V-63, I. M. Newell, oak duff [UCRC] (7); Quail Guzzler, Joshua Tree N.M., 14-V-66, E. L. Sleeper and S. L. Jenkins [LBSC] (1); 10 mi. E. Redlands, 3-X-65, R. Ryckman, *Neotoma* nest [UCRC] (24). San Diego Co.: Borrego, Palm Canyon, 25-IV-55, R. O. Schuster [CISC] (9); Borrego, Sheep Canyon, 27-IV-55, R. O. Schuster [CISC] (2); Cuyumaca State Park, 21-V-71 [CDAE] (1). Santa Barbara Co.: Santa Cruz Island, Canyon del Medio, 4-V-68, R. W. Rust, *Petrochelidon pyrrhonota* nest [UCDC] (18). Siskiyou Co.: 3 mi. N. Weed, 23-XI-71, T. R. Haig, oak duff [CDAE] (1).

Remarks: This species is easily separable from the 8-striate species *M. haigi* but is difficult to separate from the 8-striate and morphologically close *M. kanei.* The absence of median carinae on the posterior ½ of the head and the reduction of the pronotal cup to 2 anterolateral nodes distinguish it from *M. haigi,* which has complete median carina and pronotal cup. Differences from *M. kanei* are discussed under that species.

Intraspecific variation in this species is large and difficult to characterize as the differences are always of a degree and, unlike other species, occasionally intrapopulational.

In *M. kanei,* the pronotum is uniformly broadly arcuate (fig. 9) as opposed to the less arcuate more parallel-sided pronotum of *M. rudis,* however the exact form of the pronotum in *M. rudis* is quite variable. Samples from Bakersfield (south) tend to be slightly more parallel-sided and larger; Castroville (north) specimens are also large but the sides are more

arcuate; and samples from Jamesburg and Redlands are smaller and more evenly arcuate, but differ from one another in the serrations of the margins.

The numbers of punctures in elytral striae 7+8 are extremely variable within some populations. In most populations the puncture number varies

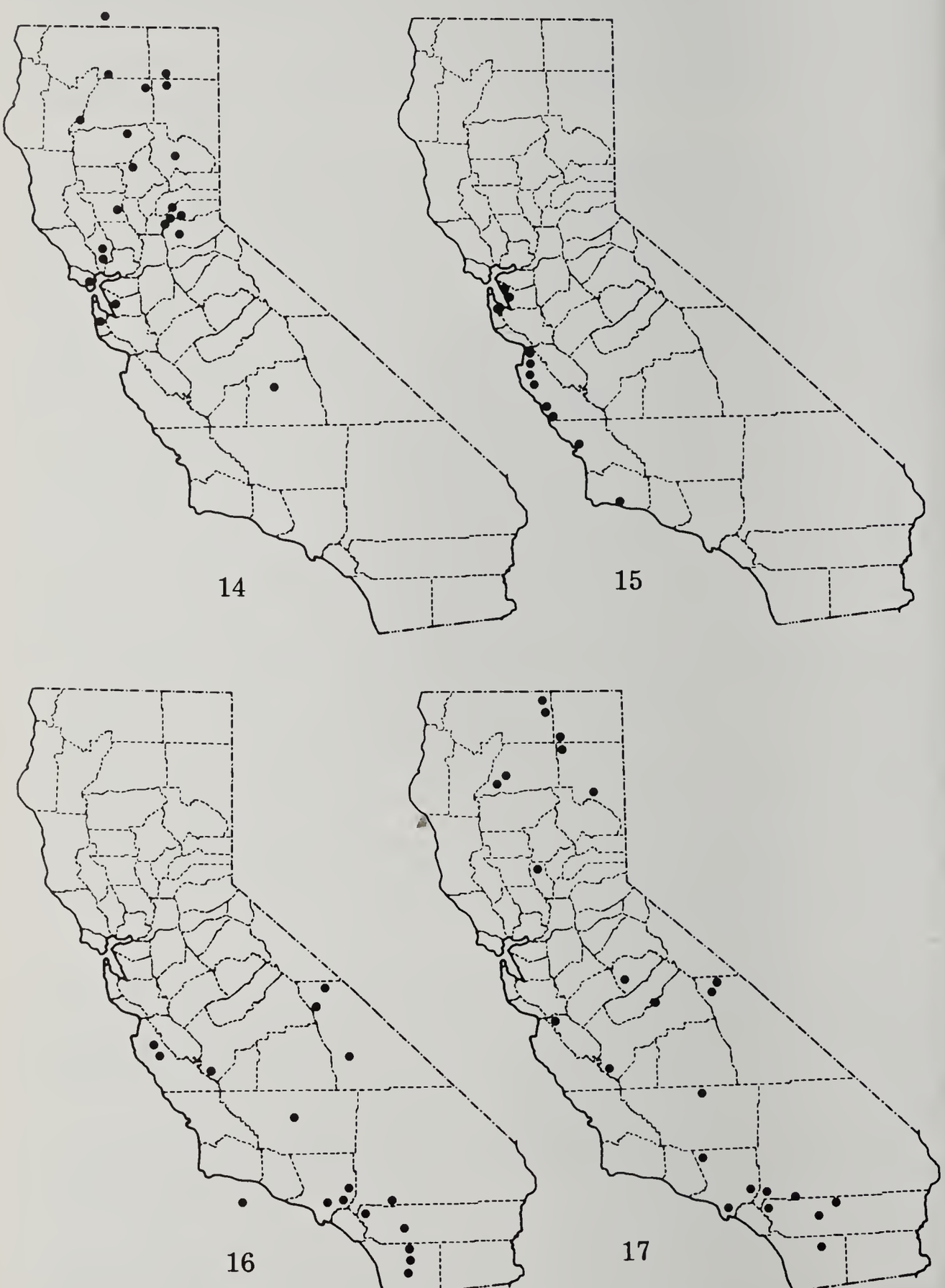


Fig. 14-17. Known geographic distributions of *Metophthalmus* spp.: 14) *M. parviceps*; 15) *M. rudis*; 16) *M. kanei*; 17) *M. haigi*.

between 6 and 8; in specimens from Jamesburg the number varies between 5 and 12, and in specimens from Palm Canyon the punctures are reduced to 1 or 2.

Metophthalmus sandersoni Andrews, **new species**

Description: Length, 1.1 mm. Width, 0.4 mm. Body short; subparallel; humped in profile; glabrous. Cuticle shining, pale reddish brown. White chalky exudate lightly covering dorsum of head, heavily covering low-profile areas of pronotum, lateral margins of elytra almost to apex, and undersurface of body except legs and terminal abdominal segments. Head short; lateral carinae distinct and parallel; median carinae partially effaced in anterior ⅓. Genal flange produced beyond eyes and subparallel; microserrulate. Antennae 11-segmented; short; segments 3-8 transverse. Pronotum wider than long by ratio of 7:5; sides microserrulate, slightly angulate medially (fig. 10); pronotal cup effaced except for lateral margins; collar binodal. Elytra 6-striate; sutural striae 15-punctate, punctations small and uniform in size; interspaces 3 and 5 distinctly carinate; humeral flange moderately expanded and produced basally. Coxae rounded; trochanters moderately elongate and diagonally truncate with femora; femora ellipsoidally expanded. Male genitalia elongate, tape-like.

Type: Washington Co., Arkansas, II-20-1938, under bark on log, M. W. Sanderson. Type to be deposited in California Academy of Sciences.

Paratypes: Same label data as type (3), 1 to Illinois Natural History Survey and 2 (1 pointed and 1 slide-mounted) to remain in author's collection.

Remarks: This species appears to be geographically separated from all other species, however it is close to *M. trux* and considering the wide known distribution of *M. trux* it is possible that additional collecting will show them sympatric (fig. 11). Morphologically it is closest to *M. trux,* from which it can be separated by having the median carinae on the head incomplete.

References Cited

Broun, T. 1914. Descriptions of new genera and species of Coleoptera. Bull. N. Z. Inst. 1(3):143-266.

Fall, H. C. 1899. Revision of the Lathridiidae of boreal America. Amer. Ent. Soc., Trans. 26:101-190.

Hammad, S. M. 1953. The immature stages of *Metophthalmus serripennis* Broun. R. Ent. Soc. Lond., Proc. (A) 28:133-138.

Hatch, M. H. 1962. The beetles of the Pacific Northwest. Part III; Pselaphidae and Diversicornia I. Seattle, University of Washington Press. 503 p.

Hinton, H. E. 1941. The Lathridiidae of economic importance. Bull. Ent. Res. 32(3):191-247.

LeConte, J. L. 1855. Synopsis of the Lathridiides of the United States and northern contiguous territories. Acad. Natur. Sci. Phila., Proc. 7: 299-305.

Motschulsky, V. 1866. Énumération des espèces de Coléoptères rapportés de ses voyages. 5-eme article. Bull. Soc. Imp. Nat. Moscou. 39(3): 225-290.

Wollaston, T. V. 1854. Insecta Maderensia; being an account of the insects of the islands of the Madeiran group. London, Van Voorst. 634 p.

THE OCCURRENCE OF THREE SPECIES OF AQUATIC COLEOPTERA ON GRAND CAYMAN ISLAND

R. Wills Flowers and William H. Klenke

Department of Entomology and Department of Education,
University of Wisconsin, Madison, WI 53706

Although distribution records for aquatic beetles of Cuba and the West Indies have been published (Leng and Mutchler 1914, 1917; Young 1953), very few records for species of the Cayman Islands are available. During a one-week visit to East End Village, Grand Cayman Island in the spring of 1975, we collected 3 species of aquatic beetles at outdoor lights. A female *Megadytes giganteus* Laporte was found beneath a floodlight the morning of 2-IV-75. That afternoon there was a brief rainstorm, and at night *Megadytes fraternus* Sharp and *Hydrophilus insularis* Laporte came in large numbers to streetlights. On the following days the weather was clear, and only a few *M. fraternus* and *H. insularis* came to light. We were not equipped to sample ponds to find the source of these beetles, but a brackish pond between East End Village and Bodden Town is a likely habitat. Specimens were identified by Dr. Paul Spangler, Smithsonian Institution, and are in the collection of the senior author.

Literature Cited

Leng, C. W., and A. J. Mutchler. 1914. A preliminary list of the Coleoptera of the West Indies as recorded to January 1, 1914. Bull. Amer. Mus. Nat. Hist. 33:391-493.

Leng, C. W., and A. J. Mutchler. 1917. Supplement to preliminary list of the Coleoptera of the West Indies. Bull. Amer. Mus. Nat. Hist. 37:191-220.

Young, F. N. 1953. The water beetles of the Bahama Islands, British West Indies (Coleoptera: Dytiscidae, Gyrinidae, Hydrochidae, Hydrophilidae). Amer. Mus. Nov. 1616:1-20.